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TUBERCULOUS DISEASE OF THE TARSUS.¹

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AMONG the joints affected by the tubercular process, those of the tarsus are involved in about ten per cent. of all cases. If in the present paper, I nevertheless venture to limit my remarks to this somewhat neglected field of joint-surgery, it is for the following reasons: (1) Because in no other portion of the skeleton, with the possible exception of the wrist, is disease so liable to spread from part to part, assuming a progressive type and generally terminating only after a number of years with partial or complete loss of the affected parts; (2) because in tarsal disease the influence of age on the progress and termination of tuberculosis of bone finds an excellent illustration; and (3) because in disease of no other part of the skeleton are the questions of how and when to operate, if operation be at all desirable, more difficult to answer.

Tuberculous disease of the tarsus, as commonly encountered, presents itself as an infiltration limited for a longer or shorter period of time to a single bone

¹ Read before the Mississippi Valley Medical Association, Louisville, October, 1890.



of the anterior or posterior row. Even here it appears to have a preference for certain bones, the cuboid of the anterior and the os-calcis of the posterior row being, in my experience, most frequently primarily involved. The greater weight brought to bear on these bones in walking, and their position, exposing them to injury, may account for this preference which doubtless exists. The extent of the joint-connections of a bone or a part of a bone, which is the seat of the disease, becomes a direct index of the rapidity of its extension. Thus the most favorable cases of the appended table were those in which the disease was limited to the os-calcis and the posterior calcaneo-astragaloid joint. A further reason for limitation to the heel-bone is in the large surfaces below, posteriorly, and on either side which are uncovered by ligaments and, therefore, permit the early evacuation of abscesses, the absence of subligamentous tension preventing the spread of disease. Far less frequent is extension forward toward the calcaneo-cuboid joint or the anterior calcaneo-astragaloid joint and its prolongation between the astragalus and scaphoid. When the latter direction has been taken the disease may easily spread around the astragalus and involve the ankle, or, affecting the scaphoid, may extend into the common tarsal sac. It is not until late in the disease that such extension takes place. In the case of a boy of eight years the disease remained limited to the calcaneum, notwithstanding one curetting done in New Orleans and another by myself two years later. In another case the disease remained limited even after five years.

In disease of the anterior tarsus the process is less likely to be localized. Made up of small bones, covered on many sides by cartilage, ensheathed in short and unyielding ligaments, the anterior division of the tarsus is an admirable place from which the disease may spread from bone to bone and from joint to joint, until each of the many is involved. The synovial membranes, if not primarily affected, are early filled with fungoid growths. Therefore the tumefied spindle-shaped appearance of the foot usually gives evidence of the nature of the disease long before the presence of sinuses makes the diagnosis certain. Adding to the complications of anterior tarsal disease is the primary or secondary involvement of more or less of the metatarsal bones. In at least two of the cases of the accompanying table the disease began in the metatarsus and remained localized until curetting was done. In the last case, recently operated upon, it could not be determined whether the primary nidus was in the cuboid or fifth metatarsal. When the area of disease was exposed it was found that the whole of the fourth and fifth and part of the third metatarsal were implicated. Finally, cases like that of John A., of the table, are encountered, in which every bone and every joint of the anterior and posterior divisions is involved, and the ankle-joint itself has not been spared. The shapelessness of the foot, the multiplicity of the sinuses, and the extent of bone denudation, as demonstrated by the probe, leave no doubt as to the wide extension of the disease.

The question presents itself, Is tarsal disease ever recovered from without operative interference?

Only twice have I witnessed so fortunate a result ; once in the case of a child with multiple sinuses leading to the anterior tarsus, and once in an adult, seen with Dr. Ravogli, in whom a very tortuous sinus leading to the astragalus closed permanently, leaving the foot with practically perfect function.

With few exceptions cases of tarsal disease, when pronounced, follow a tedious course, not for months, but for years. Except in two of my cases, in which death resulted from general tuberculosis, from two to five years elapsed before the patients were restored to usefulness, and that minus one foot or with a more or less deformed foot. If the chronological record of treatment of cases of tarsal disease be scrutinized, it will be found the same in each : Six months devoted to embrocations, massage, the ice-bag or immobilization ; six months with confinement to room or bed and the opening of abscesses ; six months or a year devoted to watching the results of repeated attempts to cure by curetting ; six months or a year given to more or less complete excision or amputation, or both. The adult with tarsal disease is deprived of three or four years of usefulness, even if recovery ensues. But in adults a fatal issue is not at all uncommon, death resulting from general tuberculosis, toward the development of which it is more than probable that our efforts to relieve sometimes contribute.

Far less gloomy is the outlook in tarsal disease of children, since in them its tendency is greater toward localization. The resistance of the surrounding structures is less than in adults. Abscesses are therefore

more readily treated, and, more than all, there is the inherent recuperative power of the tissues in early life. Curetting or the informal excision of the diseased part usually relieves the difficulty and sooner or later the child recovers with a useful foot. I have never seen a case of tarsal disease in a child that required amputation, nor do I know of such a case in the experience of my friends.

In the management of tarsal disease that of early life must therefore be nicely differentiated from that of adults. In the former orthopædic appliances, improved hygienic surroundings, and fresh-air treatment can be more readily obtained, and economy of time is not so important an element as later in life.

To curtail the miseries of an adult with tarsal disease, recourse may be had to the following measures :

1st. Scraping away the tuberculous infiltration, or *évidement* of the carious bone.

2d. To more or less formal excision of one or more of the bones of the tarsus ; and,

3d. To amputation.

Is *évidement* or curetting of caries of the tarsus followed by recoveries? Certainly not often, except in children, and I have known it to do positive harm. I may be permitted to report briefly three cases in illustration :

CASE I.—Mrs. R., aged forty-two years, seen with Dr. Schneider in 1885, had for two years a sinus on the inner side of the foot leading to a carious astragalus. Though lame, she was fully able to attend to her household duties, and her

general health was good. In April I scraped away what I believed to be all of the diseased portion of the astragalus and os-calcis. There was no septic infection, but the wound did not heal. During the summer, abscesses followed by sinuses, developed over the scaphoid. The patient was now confined to bed.

On October 8th, I made a formal excision of the posterior division of the tarsus, and of the cuboid and scaphoid. The wound again failed to heal. The continuous drain on the system, the prolonged confinement, and possibly the mechanical manipulation incident to the operation, induced pulmonary disease. On January 3, 1886, amputation of the leg was done. The wound healed kindly, but six months later the patient succumbed to phthisis.

CASE II.—R. M., a laborer, in the poorest circumstances, seen with Dr. Carr. No history of tuberculosis. He had been in a hospital for six months. There was fungous disease of the anterior division of the tarsus, but no sinus was present. The patient insisting on an early operation, I removed, by scraping, the greater portion of the cuboid bone. The wound failed to close. A rapid development of disease in parts untouched by the operation led me to make a formal excision of the entire anterior tarsus by lateral incisions. Five months later recurrence ensued, and within less than a year after the first operation the patient died of pulmonary phthisis. The opportunity for an amputation did not present itself.

CASE III.—Ed. R., aged eighteen years, a jeweller, after an attack of scarlatina, developed caries of the first metatarsal of the right foot and of the anterior tarsus of the left. When first seen sinuses had existed on the dorsal surfaces of both feet for two years, during which time, though quite lame, he followed

his vocation. The first scraping was done May 8, 1888. On February 5, 1889, excision of the anterior row of the left tarsus, the cuneiform, and the first metatarsal bone of the right foot was performed. The latter wound closed. On January 3, 1890, amputation above the ankle was performed, on account of implication of the posterior tarsus and extensive infiltration of the soft parts. Recovery was speedy, and the patient was working at his desk four months later.

Difficult as the acknowledgment is, it seems to me certain that the operation of scraping caused injury to each of these cases by disseminating the tubercular disease. The operative technique may have been at fault, although to produce ischæmia I use only the Esmarch strap without the bandage. Scraping was not performed during the acute stages; incisions were made as large as needed, and every effort was made to remove all of the diseased structures. But *évidement* has failed me and the tubercular deposits left *in situ*, increased, and were disseminated after, if not as a direct result of, the operation. Experience justifies me in holding the view that curetting in the tarsal disease of adults is an operation replete with danger.

Far more encouraging are the results obtained from early and formal excisions, particularly if the disease be limited to only a part of the tarsal framework. Until the very admirable work of Kappeller, of P. H. Watson, and, last but not least, of my friend Dr. Conner, the utility, not to mention the justifiability, of the operation was questioned. In the accompanying table cases are recorded in which one or several bones of the tarsus were excised

with fair and even with good results ; yet, as will be seen in several, probably because they were done at a later period, the final results were unfavorable. Excision, limited to one or two bones, is practically devoid of danger, and the early removal, particularly of the anterior tarsus, where the disease is oftenest found, leaves a shortened foot, but a limb of normal length.

Concerning the best method of operation there should, in my judgment, be no question. The unilateral or bilateral incisions, though they save the tendons, afford but a poor opportunity to inspect the field of disease, and if all of it is removed, it is largely due to good fortune. On the other hand, by a free incision directly across the dorsum dividing the tendons, an inspection of the entire field of operation is permitted, and every vestige of disease can be removed. If thought best, one or two longitudinal incisions can be made over the metatarsal bones, and as much of the bones as need be can be removed. In one case that was operated upon the wound healed by primary union, and three weeks after the operation there was good motion of the toes. This and another of my cases has caused me to doubt the necessity of suturing the tendons. Unless the tendons are looped before division, their suture after the excision is extremely difficult, the upper segments being so retracted in their sheaths that attempts to withdraw them generally fail. It is probable, however, that when tendon-suture is practised a more useful foot is retained. In England, Holmes and Wright favor this dorsal incision, and in Germany Barden-

heuer reports nineteen such operations, yet in three of them death resulted from general tuberculosis.

But removal of the whole or a greater portion of the tarsus is attended by a very considerable danger to life. According to Conner, the death-rate under fifteen years of age is 6.67 per cent., between fifteen and twenty-five years 10 per cent., and over twenty-five years 27.27 per cent. The latter mortality is, in my judgment, greater than that of amputation through or above the ankle. Unfortunately, as against this increased risk of life and the greater duration of treatment from late excision, there is no proportionately increased guaranty of immunity from recurrence. Even with the advanced operation of Wladimiroff Mikulicz, the hope that a definite cure could be obtained because the operation is performed in healthy tissue has been frustrated. In five of the cases of Fisher, four of Zesa's, and one of Rose's recurrence ensued.

From what has already been stated, it is evident that the third operative recourse in tarsal disease, namely, amputation, should, in my judgment, be resorted tofener and earlier to than has usually been done. In other words, it appears to me that there is a limit to the usefulness of conservatism in advanced disease of the tarsus of adults, and that the preservation of a deformed foot is hardly worth the sacrifice of three or four years of active life. Here, as elsewhere, every case is a problem, the solution of which must be largely influenced by the sex, vocation, social position, hygienic surroundings, and general condition of the patient.

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Conclusions.—Although the number of cases here tabulated is not large, a few deductions can be made. Of 30 operations made for tarsal disease there were 15 of *évidement*, of which but 2 were successful, and these were children. In 6 the curetting was followed by an exacerbation of the previous difficulty. Of the 12 excisions, 4 were primary, and in 3 the operations were made before sinuses had formed. In these primary operations the repair was more rapid than in those in which curetting had previously been done. Four of the excisions were failures, in 3 from recurrence of the disease, and in the fourth from the uselessness of the foot. While no deaths were directly attributable to tarsal disease, death resulted in 2 of the cases from general tuberculosis, which might have been avoided by a primary excision, or more certainly, by early amputation.

Name and age. Years.	Date.	Duration of illness.	No. of opera- tions.	Curet- ting.	Result.	Excis- ion.	Part removed.	Result.	Ampu- tation.	Result.	Remarks
Arthur R., 4	1882	3 years.	3	2	Failure.	I	Astragalus and tibia.	Perfect.	..	....	After failure of curetting and thorough drainage, excision was performed.
Herbert B., 8	1883	5 "	3	2	"	I	Os calcis.	"	..	.....	
Jos. B., 11	1885	3 "	1	...	.....	I	Cuboid and 1/2 of os calcis.	Good.	..	.....	
Mrs. R., 42	1885	3 "	3	1	Failure	I	Posterior tarsus, cu- boid, and scaphoid.	Failure	I	Died.	Six months later.
Isaac S., 18	1886	5 "	2	1	"	I	Os calcis.	Good.	..	.....	Jewish Hospital.
Allen P., 26	1886	2 "	1	...	.....	I	Second metatarsal and cunei- form.	"	..	.....	Railroad injury.
Thos. M., 40	1886	2 "	2	1	Failure.	I	Anterior tarsus.	Failure.	..	Died.	From phthisis.
Esther A., 7	1886	2 "	2	2	Success.	...	.....	.....	..	.....	Os calcis.
Aug. F., 4	1887	1 "	1	1	"	...	.....	.....	..	.....	Cuboid and 5th metatarsal.
Wm. Burns, 60	1887	1 "	1	1	Failure.	..	.....	.....	..	.....	Refused further interfe- rence; sent to infirmary.
Ed. R., 18	1888	4 "	3	1	"	I	Anterior row.	Failure.	I	Recov- ered.	
	1888	.....	2	1	"	I	First meta- tarsal and cuneiform	Good.	..	.....	
Jos. L., 28	1889	1 "	1	...	.....	I	Second metatarsal and cuboid	Fair.	..	....	Railroad injury; sinus re- maining three months later.
John A., 41	1890	3 "	4	2	Failure.	I	Whole tar- sus, tibia, and fibula.	Failure.	I	Recov- ered	Cincinnati Hospital.
Kate I., 23	1890	8 months.	1	...		I	Anterior tarsus and third meta- tarsal.	Good.	..		Jewish Hospital.

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